

A blue track and field track with white lane markings. In the foreground and middle ground, there are several sets of white starting blocks with brown rubber footplates. Some blocks have a white megaphone attached to them. In the background, there are yellow lane markers with the numbers 5, 6, 7, and 8. The text is overlaid on the track.

Training HS Sprints

12-14 weeks

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Part 1: The Training Basis for your Sprinters

First the Science

TRAINING ENERGY SYSTEMS

Duration of Session Effort	Energy System(s)	Power/Capacity	Training Effect
0 to 0.2 sec.	Nervous	----	Reaction
0 to 0.2 sec. (per leg)	Alactic (Stored muscle ATP)	Power	Initial Thrust
0 to 0.1 sec (speed)	Alactic (CP system)	Power	Single leg thrust at top
1 to 2.0 sec	Alactic (nervous + stored ATP + CP)	Power	Starts
2 to 5.0 sec	Alactic (CP system)	Power	Acceleration
5 to 15 sec	Alactic (CP system)	Power	Maximum speed (flying start)
15 to 30 sec	Alactic (extended CP system)	Capacity	Speed endurance (ability to hold 95%)
30 to 45 sec	Lactic	Power	Ability to produce energy w/ot O ₂ or CP
45 to 90 sec	Lactic	Capacity	As above + ability to tolerate lactic acid

Speed – Speed – Speed!!!

A fast sprinter (1-2-4) who is trained correctly will beat - every time - the strong runner.

Do not make them strong – MAKE THEM FAST!!!

This is track there is nothing difficult about being fast over 100 & 200 meters. And 90% of the time there is nothing difficult about this type of training.

How many HS sprinters run 30+ secs in the 200M? Some but not many. Therefore your top 5 boy sprinters and your top 5 girl sprinters will always run sub 30 in the deuce. In other words they are never in a lactic state which happens for all people between 28-33 seconds.

It's about training short with high intensity with appropriate and sufficient rest not about working hard for the sake of doing work.

Note: If your guys run 30+ make them team manager.

4 Pillars of Speed Development Training

It's ALL about Velocity

Track Work

Coaches Note: 60M intervals or less with a minimum of 5 min rest between each rep and no more than 540 total meters for the entire practice.

Plyometrics

Low, medium and high impact. For MS & HS stay with low and medium

Olympic Lifts (+ squats)

NOT weightlifting, NOT power lifting, ONLY Olympic Lifts (+ squats – front & back)

Rhythm

As Johnnie Cash put it. Get Rhythm!

Part 2: Season Training Cycle



Season Cycle

Remember - It's ALL about Velocity

The Running Piece:

4 Weeks

Plyometrics & Short Speed Hills (30M)

5 Weeks

Speed & Speed Endurance

3 weeks

Speed touch on Speed Endurance

Note: This is not the standard old model. Of GPP (General Physical Preparation) 4-5 weeks run a bit faster then do some speed work over the last 3-4 weeks going into state.



Part 3: Fast versus Strong - The effect of Velocity work

Math & Science vs. The Eyes & Gut

Question?

If a girl runs 12.60 (FAT) in the 100M and she runs a 55.55 400M (FAT) and you need her to run 53.55 to place top 5 in conference for points. Do you emphasize/focus on/give A LOT of attention to next season:

Speed?

Speed Endurance?

Lactic Power ?

Lactic Tolerance?

Here's some math.

$12.60 \times 4 = 50.40$ secs --- so what do you do?

Answer: velocity must change because science demands it. If she is running 55.55 with a 12.60 it means as a coach you have gotten all you can from the speed endurance (short & long) and lactic power & tolerance gears. She is not going to run $50.40 + 3.10$ seconds. It is physiologically impossible. You either make her faster or she continues to run that 55 for you for entire HS or collegiate career.

Strong vs. Fast

For the 400 you need both – But...

A 400M runner needs speed endurance (long & short)

A 400M runner needs lactic power (30-45 sec intervals)

A 400M runner needs short lactic tolerance (45-75 sec intervals)

Know the math and the sequence.

Self Control - Can you not see it and know it is still there? - Reflex fear: If I train speed only to gain velocity they will get weak!!! Yep and who cares!!! Because once you begin to train the other gears (like true 400M training requires) they will be MUCH faster.

Make them fast – then stretch them.

No 12.60 100m girl will ever run 53.55 in the 400m it is physiologically impossible – therefore you must alter her velocity (top end speed gear). BUT some folks think track is about more strength. It's not. It's about more speed! Strength work is about stretching an athletes speed not making their velocity faster. As a coach can you make a person faster?

The Showdown Race – 200M

Bolt (since 2007) is a 1-2 runner
Johnson was a 4-2 runner

Bolt @ 17 ran 20.13

Bolt @ 18 (actually 17 ½) in 2004 - ran 19.93 (he was supplementing with the 400M to help his deuce)

Bolt @ 21 PR'd with a 19.75 in Kingston. He was 2nd to Gay in Osaka (2007 World's)

We see only an improvement of .18 over 4 seasons with a tremendous amount of physical maturation occurring between 17 & 21 + combined with extensive world experience. Why so little improvement?

2 items to note:

Bolt had optimized his velocity (top-end gear) over 200M. And since he was supplementing with the 400M consistently; he was very strong. Plenty of speed endurance, lactic power and lactic tolerance in the tank. In other words his top-end gear never got faster. That flying 30M stayed relatively the same over 4 years.

Results: 19.75 was the max speed over 200M with his current velocity AND he was getting smoked by Gay on a regular basis!!! Hint: Gay is a 1-2 guy. Which means he supplements his deuce with the 1. Which means he is always improving and working on his velocity.

The Showdown Race – 200M

The Change:

In 2008 Bolt and his coaches made a change. They focused on the 100M to help improve his first 100M against Gay in the 200M. Tyson was blowing him up over the first 60M on the turn (watch the 200M final in Osaka). In 2008 we saw Bolt running the 100M ALOT and his training was in accordance with a 1-2 runner. Which means always working on improving velocity.

Results: Better velocity has occurred. And his 200M time which was stagnant over 4 years has dropped .56!!!

Question 1: if Bolt trained for the 400M and made it his new race would he break the WR? 50% chance? 65% - 80% - 90%? And Why?

Question 2:

If Bolt and his coaches continued with supplementing his deuce with the 4 would he have had this improvement?

The Showdown Race – 200M

Bolt versus Johnson - or Gay versus Johnson

Both Gay and Bolt per average race dominate Johnson at the deuce.

Note: Seasons selected over a 5 yr window and 1 year after their lifetime PR race

Bolt: 1-2 runner (2008-2010)

2010 19.56 -0.8 Kingston (NS), JAM 01/05/2010

2009 19.19 -0.3 Berlin 20/08/2009

2008 19.30 -0.9 Beijing (National Stadium) 20/08

Since Bolt became a 1-2 runner.

2007 19.75 0.2 Kingston (NS), JAM 24/06/2007

2006 19.88 0.4 Lausanne 11/07/2006

Gay: 1-2 runner

2010 19.72 0.1 Monaco 22/07/2010

2009 19.58 1.3 New York City, NY 30/05/2009

2008 20.00 1.2 Kingston (NS), JAM 03/05/2008 (note: hammy injury in '08)

2007 19.62 -0.3 Indianapolis, IN 24/06/2007

2006 19.68 -0.1 Stuttgart 10/09/2006

Johnson: 2-4 runner

1997 20.05 0.0 Des Moines, IA 26/04/1997

1996 19.32 0.4 Atlanta, GA 01/08/1996

1995 19.79 0.5 Göteborg 11/08/1995

1994 19.94 0.0 Monaco 02/08/1994

1993 20.06 1.1 Lausanne 07/07/1993

Bolt & Gay @ 400M

The reason we would give Bolt & Gay a better than 75-80% odds in breaking Johnson's 400M record is because they are faster human beings – in other words they have better velocity.

Part 1 Conclusion:

Velocity is the FIRST thing to address and look at when preparing a training system for a sprinter. These systems will differ for a middle school athlete compared to a D1 or World Class athlete. But all of them should have velocity as the key component.

Part 4: Race Models 1-2-4



400M Race Model

0-50: Meters-Big hands - push phase -drive hard for the free ride. 0-50M, 50-150M, is the where the low end phosphate workouts are.

50-150: Meters-Carry Phase #1-Fast float-off the turn and run through it. Relaxed arms and nice striding.

150-200: Meters-Get the arm ready for another aggressive arm swing.

200-250: Meters-Run into the turn with good elbow pump and maintain this action without over doing it. If you feel like your running the same speed on the turn-you're slowing down.200M-250M, belongs to the extended phosphate workouts

250-310: Meters-Start to change to a quicker arm pump and come off the turn with frequency. Always run this off the run and into the straight. 250M-310M, 310M-360M, 360M-400M are the lactate power/capacity and will power workouts. This causes a high degree of pain and most people don't enjoy it!

310-360: Meters-Carry Phase #2-Relax and keep the hands out of your face.

360-400: Meters-Guts, Glory, MOM, Apple Pie, Gluteus Lock. Frequency is the key here. (Snare drum arm swing).

200M Race Model

0-50 Meters - Big Hands-Push phase of the run

50-80 Meters - Carry Phase #1-smooth but fast running around the turn-The purpose is to maintain what you started from 0-50-This is the OUT portion

80-120 Meters - Rev up the frequency and sling shot the turn and into the straight -start this attack from the acceleration zone of the 4 x 100 (small triangle).

120-160 Meters-Carry Phase #2-Take Frequency from 80-120 and hold it with relaxation and fast snare drumming of the hands. This is another OUT.

160-200 Meters-Gun the arm cadence again-think hot track. Quick draws with hands and elbows. Not long arm pumps.

0-50m,50m-80m, 80-120m works the alactic zone for modeling the workout. No oxygen to depend on because power is in the dominant movement system. Starts, turn starts, 30-120 runs at near capacity with full recovery. (Depending on the athlete and the distance, 3 to 15 reps)

120m-160m, and 160m to 200m work the low to top end phosphate system. Power/Speed and Capacity/Speed Endurance workouts are critical here. This is one of the key areas, because it hurts big time.

100M Race Model

100 Meter Sprint Breakdown

0-30 meters

- *ATP
- *Starts-push-push-push
- *Uphill starts (20M-30M)
- *Acceleration drills
- *Contrast Training-(Tow, be towed, sprint)
- *Plyometrics (power plyos)

30-70 meters

- * Max velocity work
- * Flying 30's
- * In & Out's (20-20-20)

70-100 meters

- *Short speed endurance
- *90'-120's
- *Fast hands





Part 5: What to workout – How to workout & Sample workouts

It's Knowing How to Mix the Ingredients
It's about Volume and Sequence



Training Hint

More IS NOT better - Train energy systems.

Ask yourself what is the workout targeting and why?

Question: If you torch your 1-2-4 guys with a long speed endurance workout on Monday should you do a speed workout on Tuesday?

Learn to Mix correctly.



Sample Workouts

Speed Work

8 x 30M hills – rest 5 min between each rep

Standing start 2x30-2x40-2x50-2x60 - rest 5 min between each rep

Block Starts. 3x20M – 3x30M – 3x40M 5-6 min rest between each start

Max velocity work. 7x30M Flying starts with 5 min rest between each.

Speed workout for mid season while speed endurance is being worked.

3x60M – rest 4-5 min between each

Rest 6 min

3x60M – rest 4-5 min between each

Rest 6 min

3x60M – rest 4-5 min between each

Why mid-season? So they can maintain their velocity over 9 reps

Sample Workouts

Speed Endurance

180M-150M-120M – rest 15 min between each rep

2x180M & 2x150M rest 8-10 min between each rep

3x90M & 3x120M rest 12 min between each rep

3x60M – rest 5 min between each
Rest 6 min

3x60M – rest 30 sec between each
Rest 6 min

3x60M – rest 5 min between each

2x250M rest 21 min between each rep

Sample Workouts

Lactic Power

450M 90% target 400M time – rest 18 min then 3x150M rest 6 min between each rep. Each 150 rep should be at 90% of the target 400M or better. Note: Practice fast hands and not fighting the lactic build up on last 50M of the 450

3x(4x100's) run 100 walk 50 run 100 walk 50 etc. Rest 4-5 min between each set 75% of top end speed (CNS is engaged) – 1200M total

1x350M & 1x250M
90%+ of target time. 18 Min rest

400 the hard way. Run 100M walk back 50M Run 100M walk back 50M and so on. Until 1 full lap is completed. 90%+ of target time pace.

Recovery day – Tempo (65-70% top end)

3-4 laps. Run straight – jog 1st 50M of turn/walk 2nd 50M of turn - etc. Rest 2-3 min between each.

Sample Training Week

For MS & HS

Note: Collegiate is different based on length of season, staging, and meet peaks

MS & HS a balanced diet:

Monday – Speed (why? Because you can't do speed after blasting a workout the day before. You need to be fresh!!)

Tuesday – Tempo (why? Because you can't pop the nervous system after cooking it the day before it needs 48 hrs recovery)

Wednesday – Extended Dynamic drills ONLY – no running no weights no plyos, *very* light day before competition

Thursday – Meet Day – This is all out like Monday. Speed day (1-2, 4x1) or Speed Endurance day (2-4, 4x4)

Friday – Tempo (why? See Tuesday note)

If Meet is on Friday then

Monday – Speed (why? Because you can't do speed after blasting a workout the day before. You need to be fresh!!)

Tuesday – Light Tempo (why? Because you can't pop the nervous system after cooking the day before it needs 48 hrs recovery)

Wednesday – Speed Endurance (why? Rested and can go again but do not be greedy here with volume go for quality you are 48 hrs from competition).

Thursday – Extended Dynamic drills – no running, no weights, no plyometrics

Friday – Meet Day

SPRINT PROJECTIONS

<i>30 BLOCK</i>	<i>30 FLY</i>	<i>60 BLOCK</i>	<i>150 STAND</i>	<i>100 METERS</i>	<i>200 METERS</i>
<i>3.58-3.61</i>	<i>2.48-2.51</i>	<i>6.22-6.27</i>	<i>14.87-14.97</i>	<i>10.09-10.16</i>	<i>20.17-20.32</i>
<i>3.62-3.65</i>	<i>2.52-2.55</i>	<i>6.28-6.33</i>	<i>14.98-15.08</i>	<i>10.17-10.24</i>	<i>20.33-20.48</i>
<i>3.66-3.69</i>	<i>2.56-2.59</i>	<i>6.34-6.39</i>	<i>15.09-15.19</i>	<i>10.25-10.32</i>	<i>20.49-20.64</i>
<i>3.70-3.73</i>	<i>2.60-2.63</i>	<i>6.40-6.45</i>	<i>15.20-15.30</i>	<i>10.33-10.40</i>	<i>20.65-20.80</i>
<i>3.74-3.77</i>	<i>2.64-2.67</i>	<i>6.45-6.51</i>	<i>15.31-15.42</i>	<i>10.41-10.48</i>	<i>20.81-20.96</i>
<i>3.78-3.81</i>	<i>2.68-2.71</i>	<i>6.52-6.57</i>	<i>15.43-15.54</i>	<i>10.49-10.56</i>	<i>20.97-21.12</i>
<i>3.82-3.85</i>	<i>2.72-2.75</i>	<i>6.58-6.63</i>	<i>15.55-15.66</i>	<i>10.57-10.64</i>	<i>21.13-21.28</i>
<i>3.86-3.89</i>	<i>2.76-2.79</i>	<i>6.64-6.69</i>	<i>15.67-15.79</i>	<i>10.65-10.72</i>	<i>21.29-21.44</i>
<i>3.90-3.93</i>	<i>2.80-2.83</i>	<i>6.70-6.75</i>	<i>15.80-15.92</i>	<i>10.73-10.80</i>	<i>21.45-21.61</i>
<i>3.94-3.98</i>	<i>2.84-3.88</i>	<i>6.76-6.81</i>	<i>15.93-16.06</i>	<i>10.81-10.90</i>	<i>21.62-21.88</i>
<i>3.99-4.03</i>	<i>2.89-2.93</i>	<i>6.82-6.87</i>	<i>16.07-16.20</i>	<i>10.91-11.00</i>	<i>21.89-22.09</i>
<i>4.04-4.08</i>	<i>2.94-2.98</i>	<i>6.88-6.93</i>	<i>16.21-16.35</i>	<i>11.01-11.09</i>	<i>22.10-22.30</i>
<i>4.09-4.13</i>	<i>2.99-3.03</i>	<i>6.94-6.99</i>	<i>16.36-16.51</i>	<i>11.10-11.19</i>	<i>22.31-22.50</i>
<i>4.14-4.18</i>	<i>3.04-3.08</i>	<i>7.00-7.05</i>	<i>16.52-16.68</i>	<i>11.20-11.29</i>	<i>22.51-22.72</i>
<i>4.19-4.24</i>	<i>3.09-3.14</i>	<i>7.06-7.12</i>	<i>16.69-16.86</i>	<i>11.30-11.40</i>	<i>22.73-22.95</i>
<i>4.25-4.30</i>	<i>3.15-3.20</i>	<i>7.13-7.19</i>	<i>16.87-17.03</i>	<i>11.41-11.51</i>	<i>22.96-23.19</i>
<i>4.31-4.36</i>	<i>3.21-3.26</i>	<i>7.20-7.26</i>	<i>17.04-17.25</i>	<i>11.52-11.62</i>	<i>23.20-23.43</i>
<i>4.37-4.42</i>	<i>3.27-3.32</i>	<i>7.27-7.33</i>	<i>17.26-17.46</i>	<i>11.63-11.73</i>	<i>23.44-23.69</i>
<i>4.43-4.48</i>	<i>3.33-3.38</i>	<i>7.34-7.40</i>	<i>17.47-17.67</i>	<i>11.74-11.85</i>	<i>23.70-23.95</i>
<i>4.49-4.54</i>	<i>3.39-3.44</i>	<i>7.41-7.50</i>	<i>17.68-17.88</i>	<i>11.86-12.01</i>	<i>23.96-24.27</i>
<i>4.55-4.60</i>	<i>3.45-3.50</i>	<i>7.51-7.60</i>	<i>17.89-18.09</i>	<i>12.02-12.17</i>	<i>24.28-24.64</i>
<i>4.61-4.70</i>	<i>3.51-3.60</i>	<i>7.61-7.70</i>	<i>18.10-18.30</i>	<i>12.18-12.33</i>	<i>24.65-24.98</i>
<i>4.71-4.80</i>	<i>3.61-3.70</i>	<i>7.71-7.80</i>	<i>18.31-18.55</i>	<i>12.34-12.49</i>	<i>24.99-25.30</i>
<i>4.81-4.90</i>	<i>3.71-3.80</i>	<i>7.81-7.90</i>	<i>18.56-18.81</i>	<i>12.50-12.65</i>	<i>25.31-25.65</i>
<i>4.91-5.00</i>	<i>3.81-3.90</i>	<i>7.91-8.00</i>	<i>18.82-19.12</i>	<i>12.66-12.85</i>	<i>25.66-25.99</i>
<i>5.00-5.01</i>	<i>3.90-4.00</i>	<i>8.00-8.10</i>	<i>19.20-19.60</i>	<i>12.90-13.10</i>	<i>26.00-26.50</i>
<i>5.10-5.20</i>	<i>4.00-4.10</i>	<i>8.10-8.20</i>	<i>19.60-20.00</i>	<i>13.10-13.30</i>	<i>26.50-27.00</i>
<i>5.20-5.30</i>	<i>4.10-4.20</i>	<i>8.20-8.30</i>	<i>20.00-20.40</i>	<i>13.30-13.60</i>	<i>27.00-27.50</i>
<i>5.30-5.50</i>	<i>4.20-4.40</i>	<i>8.30-8.40</i>	<i>20.40-20.80</i>	<i>13.60-13.90</i>	<i>27.50-28.80</i>